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*          U. S.   P A T E N T   T E X T   F I L E               *
*                                                                *
*  THE WEEKLY PATENT TEXT AND IMAGE DATA IS CURRENT              *
*  THROUGH July 20,1999                                     *
*                                                                *
*                                                                *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

=> s (breath or breathing) and (nose or nostril? or mouth?)

          6212 BREATH
         14062 BREATHING
         44956 NOSE
          1711 NOSTRIL?
         78163 MOUTH?
L1        5923 (BREATH OR BREATHING) AND (NOSE OR NOSTRIL? OR MOUTH?)

=> s l1 and air flow

        703364 AIR
        849296 FLOW
         80902 AIR FLOW
                 (AIR(W)FLOW)
L2        1479 L1 AND AIR FLOW

=>s real time and l2

        111257 REAL
       1581429 TIME
         51713 REAL TIME
                 (REAL(W)TIME)
L3          98 REAL TIME AND L2

=>s l3 and sensor?

        255365 SENSOR?
L4          88 L3 AND SENSOR?

=> s l4 and acoust?

         51831 ACOUST?
L5          33 L4 AND ACOUST?

=> s l5 and vibrat?

        174950 VIBRAT?
L6          31 L5 AND VIBRAT?

=> s l6 and microphone

         20189 MICROPHONE
L7           5 L6 AND MICROPHONE

=> s l6 and respiratory sound intensity

         17822 RESPIRATORY
         98750 SOUND
        181762 INTENSITY
             0 RESPIRATORY SOUND INTENSITY
                 (RESPIRATORY(W)SOUND(W)INTENSITY)
L8           0 L6 AND RESPIRATORY SOUND INTENSITY

=> s l5 and decibel?

          6879 DECIBEL?
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5,404,885

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L9             0 L5 AND DECIBEL?

=> s l5 and decibel

          2357 DECIBEL
L10            0 L5 AND DECIBEL

=> s l5 and breath monitor

          6212 BREATH
        141655 MONITOR
             6 BREATH MONITOR
                 (BREATH(W)MONITOR)
L11            0 L5 AND BREATH MONITOR

=> s l5 and monitor

        141655 MONITOR
L12           27 L5 AND MONITOR

=> s l12 and  vibrat?

        174950 VIBRAT?
L13           26 L12 AND  VIBRAT?

=> s l13 and 600/529-538/cclst

          1064 600/529-538/CCLST   (10 TERMS)
                 (600/529+NEXT9/CCLST)
```

Item #1

ABSTRACT:
A . . . two of the lumens used to provide the consumable filtration material. The filtration material is interposed between the carbon dioxide **sensor** and the carbon monoxide **sensor** which are mounted inside the monitor housing. The filter unit also interfaces the canula for receiving the patient's breath sample. . .

SUMMARY:

BSUM(2)

This invention relates to methods and apparatus for invivo, **real time** measurement of end-tidal carbon monoxide concentration in the exhaled breath, more particularly to a filter unit for use in the. . .

SUMMARY:

BSUM(11)

Chemical electrochemical **sensors** capable of measuring carbon monoxide concentrations in the range of interest, 0 to 500 parts per million (ppm), are commercially available, e.g., model DragerSensor CO available from Dragerwerk, Lubeck, Germany. However, such **sensors** are sensitive to many other gases as well as carbon monoxide, and are therefore susceptible to error. Another problem with such **sensors** is that the measurement dynamics of the sample gas transport through the gas permeable membrane and oxidation-reduction in the electrochemical. . .

SUMMARY:

BSUM(13)

It . . . measuring carbon monoxide concentration in the end-tidal breath. It is another object to provide apparatus and methods that operate in **real-time**. It is another object to provide apparatus and methods for use in determining the rate of hemolysis from the concentration. . .

SUMMARY:

BSUM(15)

It . . . in a nursery, a physician's office, a hospital, a clinic, and a mobile clinic for measuring end-tidal carbon monoxide in **real-time**, for assessing the likelihood of elevated levels of hemolysis for immediate entry on the patient's record and prescription of an. . .

SUMMARY:

BSUM(19)

The . . . distinguish carbon monoxide in end-tidal breath from carbon monoxide in inspired air, to derive the end-tidal carbon monoxide concentration in **real-time**. More particularly, a conventional carbon monoxide detector can be used to obtain the average carbon monoxide concentration level during breathing,. . .

SUMMARY:

BSUM(20)

One . . . or duty cycle of the end-tidal portion of the sensed concentration waveform relative to the inspired air is determined. A **sensor** for detecting the level (or concentration) of the second gas having a time response that is fast enough to distinguish. . .

SUMMARY:

BSUM(22)

Another . . . dioxide detector. The second flow path contains the consumable filtration medium and provides a flow path between the carbon dioxide **sensor** and the carbon monoxide **sensor**.

DRAWING DESC:

DRWD(6)

FIGS. . . . 2F are circuit schematic diagrams for a signal conditioning amplifier and a power supply respectively, for interfacing the carbon monoxide **sensor** of FIG. 1 and the microcontroller circuit board of FIG. 2;

DETDESC:

DETD(2)

Referring . . . over a period of time and determining the end-tidal concentration of carbon monoxide in the breath. The apparatus includes a **nasal cannula** 10, a carbon dioxide detector 30, an organic vapor filter 45, a flow regulator 50, a pump 60, a carbon. . .

DETDESC:

DETD(8)

It . . . for measuring flow velocity or flow volume, a non breath flow device for monitoring breathing, e.g., an impedance pneumograph, a **microphone sensor**, and the like. Also, a breath gas detector for monitoring a breath gas other than carbon dioxide may be used.

DETDESC:

DETD(9)

The . . . non intrusive and non invasive technique for determining the duty cycle dc. It does not require an additional or alternate **sensor** or transducer on or near the patient and it does not require additional patient cooperation or discomfort. Furthermore, using one. . .

DETDESC:

DETD(10)

Other gas **sensors** may be used, e.g., oxygen which would have a relatively reduced concentration level during end-tidal breath, or hydrogen, which would. . .

DETDESC:

DETD(11)

Another . . . acquisition processing analysis of the last acquired sample. As a result, the end-tidal carbon monoxide determination is effectively provided in **real-time** and without the delay occasioned by the previously reported techniques. In addition, the present invention avoids reliance on a previously. . .

DETDESC:

DETD(17)

Carbon monoxide detector 70 is preferably an electrochemical **sensor** that produces an electrical current proportional to the concentration of reducing gases, such as carbon monoxide, which are present in. . .

DETDESC:

DETD(18)

One suitable carbon monoxide **sensor** is model DragerSensor CO, available from Dragerwerke of Lubeck, Germany. It has a plastic gas permeable membrane, a liquid electrolyte,. . .

DETDESC:

DETD(43)

Plug . . . on the end 503 side of filter 45. Plug 510 has a length d21 of about 1.0 cm and an **air flow** passageway 511 extending through its longitudinal axis, having an inner diameter of about 0.3 cm. The length is not critical. . .

DETDESC:

DETD(51)

According . . . the measures of the concentrations of the carbon dioxide and carbon monoxide in the sample cells of the carbon dioxide **sensor** 30 and carbon monoxide **sensor** 70 are obtained, respectively. The measures are obtained as analog signals from the detectors 70 and 30, e.g., sensed currents. . .

DETDESC:

DETD(72)

When . . . measured and the routine enters pause step 122. During the pause step 122, the operator is prompted to place the **nasal cannula** 10 inside the patient's nostril and then to press button #1 to resume the measurement sequence. The system preferably displays a suitable message on display 90, e.g., "place **nasal cannula**", to prompt the user to place the cannula 10. The pause step 122 preferably includes a minimum delay period Timeout. . . level will change very much. The Timeout period also is selected to permit the operator sufficient time to insert the **nasal cannula** 10 in a patient, such as a newborn infant, which may require some time to accomplish.

DETDESC:

DETD(80)

The . . . the anatomical waveform of respiration from which the ratio of the end-tidal portion total air can be derived. The CO.sub.2 **sensor** time response of 120 ms gives adequate resolution without acquiring excessive data. The sampling rate of 1 Hz for the. . . data resolution. The selected rates were selected as compromises between collecting sufficient data with adequate resolution in view of the